

ENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:
MAGNA INTERNATIONAL INC.
Attn. IMAI, Jeffrey T.
337 Magna Drive
Aurora, Ontario L4G 7K1
CANADA

MAGNA INTERNATIONAL INC. NOTIFICATION OF TRANSMITTAL OF
PATENT DEPARTMENT THE INTERNATIONAL SEARCH REPORT
RECEIVED OR THE DECLARATION

JAN 18 2001

(PCT Rule 44.1)

DOCKETED

Date of mailing
(day/month/year)

22/12/2000

Applicant's or agent's file reference

701588PCT

FOR FURTHER ACTION

See paragraphs 1 and 4 below

International application No.

PCT/CA 00/00954

International filing date
(day/month/year)

16/08/2000

Applicant

DECOMA INTERNATIONAL CORP.

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority

 European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Amélie Möller

PATENT COOPERATION TREATY

MAGNA INTERNATIONAL INC.
TRADEMARK DEPARTMENT
RECEIVED

AUG 03 2001

DOCKETED 701588 PCT
PCT

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

IMAI, Jeffrey T.
Magna International Inc.
337 Magna Drive
Aurora, Ontario L4G 7K1
CANADA

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year) 30.07.2001

Applicant's or agent's file reference
701588PCT

IMPORTANT NOTIFICATION

International application No.
PCT/CA00/00954

International filing date (day/month/year)
16/08/2000

Priority date (day/month/year)
16/08/1999

Applicant
DECOMA INTERNATIONAL CORP.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Langhoff, M

Tel. +49 89 2399-8221



PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 701588PCT	FOR FURTHER ACTION <small>see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.</small>	
International application No. PCT/CA 00/ 00954	International filing date (<i>day/month/year</i>) 16/08/2000	(Earliest) Priority Date (<i>day/month/year</i>) 16/08/1999
Applicant DECOMA INTERNATIONAL CORP.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

CA 00/00954

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B29C45/16 B60R19/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B29C B60R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 8, no. 276 (M-346), 18 December 1984 (1984-12-18) -& JP 59 146826 A (HASHIMOTO FORMING KOGYO KK), 22 August 1984 (1984-08-22) abstract	1
A	--- PATENT ABSTRACTS OF JAPAN vol. 1995, no. 09, 31 October 1995 (1995-10-31) -& JP 07 164466 A (NISSAN MOTOR CO LTD), 27 June 1995 (1995-06-27) abstract -----	1, 4

☐ Further documents are listed in the continuation of box C.☐ Patent family members are listed in annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

13 December 2000

Date of mailing of the international search report

22/12/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Bollen, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

CA 00/00954

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 59146826 A	22-08-1984	JP 1636504 C JP 2063048 B	31-01-1992 27-12-1990
JP 07164466 A	27-06-1995	NONE	

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 701588PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/CA00/00954	International filing date (day/month/year) 16/08/2000	Priority date (day/month/year) 16/08/1999
International Patent Classification (IPC) or national classification and IPC B29C45/16		
Applicant DECOMA INTERNATIONAL CORP.		



1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 26/02/2001	Date of completion of this report 30.07.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Clarke, A Telephone No. +49 89 2399 8421 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/CA00/00954

I. Basis of this report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-10 as originally filed

Claims, No.:

1-7 as originally filed

Drawings, sheets:

1/12-12/12 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/CA00/00954

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-7
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-7
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-7
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The present application relates to the formation of a composite fascia assembly, in which a first material is moulded and solidified and a second material is moulded and solidified such that the two resulting components are interconnected.

The relevant prior art discloses fascia assemblies which have been moulded but neither anticipates nor suggests the combination of features of the present claims.

Re Item VII

Certain defects in the international application

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Re Item VIII

Certain observations on the international application

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents

- D1: PATENT ABSTRACTS OF JAPAN vol. 8, no. 276 (M-346), 18 December 1984 (1984-12-18) -& JP 59 146826 A (HASHIMOTO FORMING KOGYO KK), 22 August 1984 (1984-08-22)
- D2: PATENT ABSTRACTS OF JAPAN vol. 1995, no. 09, 31 October 1995 (1995-10-31) -& JP 07 164466 A (NISSAN MOTOR CO LTD), 27 June 1995 (1995-06-27)

is not mentioned in the description, nor are these documents identified therein. Furthermore, a document reflecting the prior art described on page 1, is not identified in the description.

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication. (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

METHOD FOR FORMING A FASCIA ASSEMBLY FOR A MOTOR VEHICLE

Field of the Invention

5 The present invention relates to a method for forming a fascia assembly for a front or rear end of a motor vehicle. In particular, the present invention relates to a method wherein first and second fascia assembly components are fastened together by a molded interlock.

10 Background of the Invention

 When manufacturing and assembling fascia assemblies for the front or rear end of a motor vehicle, the exterior fascia panel is usually molded by itself and then connected to other fascia assembly components, such as a bumper beam or a grill and headlamp carrier panel, by fasteners such as threaded bolts. To connect the fascia panel to one of the other
15 fascia assembly components in such a manner, the panel and the component are typically molded separately and then brought to an assembly station where bores are drilled into the panel and the component. Then, the drilled bores are aligned and bolts are inserted into the aligned bores and securely tightened with nuts to fasten the panel and component together.

20 This conventional approach has two primary drawbacks. First, the conventional approach is relatively inefficient. Specifically, molding the panel and component separately and then bringing them together at an assembly station for fastening is time consuming and occupies manpower and other resources that could be eliminated or more efficiently used elsewhere.

25 The second drawback is that variations in dimensional tolerances between the panel and the component can make it difficult to properly fasten them together using a simple nut/bolt fastening arrangement. That is, when there is misalignment between the holes in the panel and the component, a fastener cannot be easily inserted through the holes. Instead, the holes on either the panel or the component must be widened by further drilling
30 or the like to ensure that the bolts can pass through the holes. These widened holes are undesirable because, even though they allow the panel and the component to be fastened together, they also allow for relative movement between the panel and the component. This can create visible misalignments when the component is of the kind that is designed to support an exterior structure (e.g., the grill or the headlamps) in a particular orientation
35 with respect to the fascia panel. Consequently, there exists a need for an improved method of assembling a front or rear end fascia assembly that overcomes these inefficiency and tolerance problems associated with the conventional method.

Summary of the Invention

It is an object of the present invention to provide a method comprising: (1) molding and solidifying a molten first material so as to form an exterior fascia panel having a first connecting portion integrally molded therewith, and (2) molding and solidifying a molten second material so as to form a fascia assembly component having a second connecting portion integrally molded therewith and molded and solidified to the connecting portion of said exterior fascia panel in an interconnected relationship. The fascia assembly component may be a bumper beam, a pair of transversely spaced apart lamp receiving structures, a carrier panel that mounts the grill and the lamps, a collapsible impact assorting structure, or any other component that connects to the fascia panel.

Connecting the fascia panel and the fascia assembly component in such a manner obviates the need for forming the panel and component separately and then bringing them to an additional assembly station where they would conventionally be secured together using nuts and bolts. Instead, the panel and component are interconnected together by the molded connecting portions. Also, the problems associated with varying dimensional tolerances between the panel and the second fascia assembly component are eliminated because the connecting portions are molded together and are not assembled separately.

It should be understood that the present invention may be practiced using a single mold or using a different mold for each component. A single injection mold using a two-shot process is preferred wherein one molten material is injected into the mold to form either the panel or the component and then another molten material is injected into the mold to form the other of the panel and the component. The use of a single mold is preferred because two operations can be performed at a single station, thereby eliminating costs associated with obtaining and operating an additional mold for the second component.

The order in which the panel and components are molded is also not critical to the principles of the present invention. Either the panel may be molded first or the fascia assembly component may be molded first. In a two-shot, single mold operation the molten material for both the panel and the component may be injected sequentially or simultaneously.

In accordance with a further aspect of the invention, a bore may be formed through the connecting portions of the panel and the fascia assembly component and a pin, a rivet, or other interlocking structure may be inserted through the bore to enhance the interconnection between the two connecting portions. Alternatively, the interlocking structure may be provided as an insert in the mold with the molten material being molded around it as the panel and component are being formed. The use of an interlocking structure is not essential to the principles of the present invention, but enhances the

interconnection between the panel and the fascia assembly component by preventing separation between the connecting portions. When the fascia assembly is installed on the vehicle, the strength of the interconnection is usually not significantly important because the fascia panel and the fascia assembly component will typically be connected to points
5 on the vehicle body or frame and thus an interconnection is not necessary to keep the fascia panel and the fascia assembly component from separating. However, the interconnection between the panel and the second fascia assembly component is relatively important prior to mounting the fascia assembly to the vehicle, especially during transport and handling of the fascia assembly. Thus, this pin, or any other type of interlocking
10 insert, is particularly useful in preventing separation of the fascia panel and the fascia assembly component prior to mounting the assembly on the vehicle.

Brief Description of the Drawings

Fig. 1 is a perspective view showing a fascia assembly constructed in accordance
15 with the method of the present invention with an exterior fascia panel of the assembly being interconnected with the bumper beam of the assembly;

Fig. 2 is a profile view showing the cross-section illustrated in Fig. 1.;

Fig. 3 is a close-up view showing one of the portions where the fascia panel and the bumper beam are interconnected;

20 Fig. 4 is a cross-sectional view of an injection molding die assembly used in conjunction with the method of the present invention to perform a two-shot molding operation wherein the bumper beam and the exterior fascia panel are molded and interconnected together;

Fig. 5 is a cross-sectional view of the die assembly taken along line 5-5 of Fig. 4;

25 Fig. 6 shows the injection molding die assembly of Fig. 5 with a first molten material being injected therein to form the exterior fascia panel;

Fig. 7 shows the injection molding die assembly of Fig. 5 with a second molten material being injected into the assembly to form the bumper beam after the first molten material has been injected as shown in Fig. 6;

30 Fig. 8 is a perspective view of another fascia assembly constructed in accordance with the method of the present invention with a head lamp receiving can being interconnected with the exterior fascia panel;

Fig. 9 is a cross-sectional view taken along line 9-9 of Fig. 8;

Fig. 10 shows an injection molding die assembly used to mold the assembly of Fig.
35 8 in a two-shot operation;

Fig. 11 shows another fascia assembly formed using the method of the present invention with a pair of head lamp receiving cans and a grill opening reinforcement

structure; and

Fig. 12 is a cross-section of yet another fascia assembly formed using the method of the present invention with a series of energy absorbing structures disposed between the panel and the bumper beam.

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Detailed Description of the Preferred Embodiment of the Invention

Fig. 1 shows a perspective view of a fascia assembly for the front end of a motor vehicle formed using the method of the present invention. The fascia assembly is generally indicated at 10. The exemplary fascia assembly 10 shown in Fig. 1 comprises two basic components. These two components are an exterior fascia panel 12 and a rigid bumper beam 14. The exterior fascia panel 12 constitutes a part of and is connected to the vehicle body when the fascia assembly 10 is mounted to the front end of the motor vehicle. The bumper beam 14 is secured by fasteners, welding, or other suitable attachment means to the frame of the vehicle when the fascia assembly 10 is secured to the front end of the vehicle. When the assembly 10 is mounted to the vehicle, the exterior fascia panel 12 conceals the bumper beam 14 from view.

It can be appreciated from Fig. 1 that the fascia panel 12 is provided with a contoured exterior surface 16 that provides the front end of the vehicle with an aesthetic appearance. The preferred material for forming the fascia panel 12 is a thermoplastic that is somewhat flexible when solidified so as to resist denting, such as thermal polyolefin (TPO).

The bumper beam 14 is formed from a rigid material that resists failure/collapse during an automobile impact, such as a glass-filled thermoplastic. The bumper beam 14 is designed to absorb collision impacts when the assembly 10 is mounted to the front end of the motor vehicle. Because the bumper beam 14 is secured to the vehicle frame, during vehicle impacts the forces absorbed by the bumper beam 14 will be transferred directly to the vehicle frame.

It can be best appreciated from Fig. 2 that the exterior fascia panel 12 has a plurality of integrally formed connecting portions 18 (three as shown in Fig. 2) extending rearwardly from the interior surface 20 of the panel 12. Likewise, the bumper beam 14 also has a plurality of integrally formed connecting portions 22 extending forwardly from the front face thereof. These connecting portions 18, 22 are interconnected together as a result of the fascia assembly 10 being constructed in accordance with the method of the present invention. A fastener, rivet, pin, or some other type of interlocking structure 24 may be inserted through the region where the connecting portions 18, 22 of the panel 12 and the bumper beam 14 are interconnected in order to enhance and strengthen the connection between the connecting portions 18, 22.

Referring to Fig. 3, the connecting portions 18, 22 are shown as overlapping with clean straight lines delineating portion 18 from portion 22 simply to schematically illustrate the connection of connecting portions 18, 22. As will become appreciated from the following description of the method of the present invention, the connecting portions 18, 22 will not be interconnected in such a clean, straight-line manner. Instead, the material defining the connecting portions 18, 22 will run together while melted and solidify together to form a bonded connection between the interconnecting portions 18, 22.

Fig. 4 shows an injection die assembly 30 which may be used to perform the method of the present invention. The injection molding die assembly 30 is a two-shot molding assembly in which two different molten materials can be injected into the die cavity 32. The gates for controlling the flow of the two materials are shown schematically at 34 and 36. The die assembly 30 comprises four die portions, three of which are shown in Fig. 4. The die portions shown in Fig. 4 include a first die portion 38 that provides an interior surface 40 which has a shape corresponding to the shape of the fascia panel's exterior surface 16. A second die portion 42 is provided opposite the first die portion 38 and has an interior surface 44 with a shape corresponding to the shape of the rear face and upper and lower edges of the bumper beam 14. Each of these die portions 38, 42 have a passageway 46, 48, respectively, formed therethrough and opening to the interior surface 40, 44 thereof. These passageways 46, 48 communicate with gates 34, 36, respectively, so that molded material can be injected into the die cavity through the passageways 46, 48.

As best seen in Fig. 5, the die assembly 30 also includes a third die portion 50 and a fourth die portion 52 that are disposed between the first and second die portions 38, 42 when the die assembly 30 is closed and ready for injection. The third and fourth die portions 50 and 52 cooperate to provide a surface 54 that has a shape corresponding to the shape of the interior surface 20 of the fascia panel 12, and a series of surfaces 56 (best seen in Fig. 4) that cooperate to define the portions of the bumper beam's front face that are located between the connecting portions 22. The third and fourth die portions 50, 52 also provide a series of surfaces 58 that cooperate to define portions 60 of the die cavity that extend through the third and fourth die portions 50, 52 between surfaces 54 and 56. As will be appreciated below, these die cavity portions 60 are the areas where the connecting portions 18, 22 are formed, molded and solidified together. Together, surfaces 40, 44, 54, 56, and 58 cooperate together when the die assembly 30 is closed to form a die cavity 62 in which the fascia panel 12 and the bumper beam 14 will be molded and solidified together.

Turning now to Figs. 6 and 7, the method of the present invention will now be described. Fig. 6 shows the mold assembly 30 in its sealed, operative position with all four die portions moved into place. This is accomplished by bringing the third and fourth die portions 50, 52 together in the lateral direction of the assembly 30 (left and right as

viewed in Fig. 56) and then moving the first and second die portions 38, 42 into sealed operative engagement with the third and fourth die portions 50, 52 to the position shown in Fig. 6. Then, as is conventional in the molding art, a vacuum is applied to draw the air out from the die cavity 62. This prevents bubbles from forming in the final, molded product.

5 Next, gate 34 is opened and a first molten material 64 is injected into the die cavity 62 through passageway 46. This first molten material 64 fills the portion of the die cavity 62 that forms the fascia panel 12 and partially fills the portions 60 that form the connecting portions 18 and 22. It is to be understood that gate 34 is provided to schematically show this first injection step. To better ensure that upper and lower portions of the mold cavity
10 are filled before portions 60, a pair of gates communicated at the upper and lower ends of the first die portion 38 may be used instead of the single gate 34.

 The first gate 34 is then closed and the second gate 36 is opened and a second molten material 66 is injected into the die cavity 68 through passageway 48. This second material fills the portion of the die cavity 62 that forms the bumper beam 14 and fills the
15 remainder of the portion 60 that defines the connecting portions 18, 22. Finally, the first and second molten materials 64, 66 are allowed to solidify and the die assembly 30 can then be opened and the fascia assembly 10 can be removed therefrom. It can be appreciated that the first and second molten materials 64, 66 come together in the die cavity portions 60 to form the connecting portions 18, 22. At the area where the
20 connecting portions 18, 22 meet, the first and second materials 64, 66 intermix and bond together to form an interconnection between the connecting portion 18, 22 when solidified.

 It should be understood that the method of the present invention is not limited to the two-shot method described above. Instead, the fascia panel 12 and its connecting portions 18 may be molded and solidified at one injection molding station and then
25 brought to a second molding station whereat the panel 12 is placed in a mold and the bumper beam 14 is molded and solidified with its connecting portions 22 molded and solidified to the fascia panel's connecting portions 18.

 With either of these methods, interconnecting structures 24 may be used to enhance the bond between the connecting portions 18, 22. The interlocking structure 24 shown in
30 Figs. 2 and 3 is driven vertically through all three of the regions where the connecting portions 18, 22 meet after the assembly 10 has been solidified and removed from mold assembly 30 (or the second molding station). Alternatively, individual interlocking structures, such as short cylindrical pins, may be molded into each set of connecting portions 18, 22 by placing the interlocking structures into the mold as inserts. For
35 example, a series of these short pins could be placed as inserts into the die cavity portions 60 of die assembly 30 and then the molten materials 64 and 66 can be solidified around these pins. To separate the panel 12 and beam 14 for repair or replacement of the panel or

beam (i.e. if one has been damaged during a collision), the interlocking structure 24 can be removed by drilling or the like to facilitate separation. Once separated, the damaged piece can be repaired and reattached or discarded for recycling.

Another alternative to inserting separate pins or other interlocking structures through the connecting portions 18, 22 is to use a mold insert that provides one of the connecting portions 18, 22 with a T-shape or an L-shape and solidifying that shape and then removing the mold insert before injecting the other material. As the other material is injected into the mold, the other material surrounds the solidified T or L-shape. This enhances the interconnection between the interconnecting portions 18, 22 because the manner in which the second injected material surrounds the T or L-shape provides a firm mechanical connection in addition to bonding between the materials.

It is to be understood that the connection between the panel 12 and the beam 14 is provided to ensure that the panel 12 and beam 14 remain connected to one another until the fascia assembly 10 is assembled to the end of the vehicle. At that point, the panel 12 is fastened to the vehicle body and the beam 14 is fastened to the vehicle frame. The interconnection between the panel 12 and beam 14 does not play a role in keeping together during vehicle operation. Instead, the interconnection serves to keep the beam 14 and panel 12 together as a single unit for delivery to the vehicle assembly site and mounting onto the vehicle end.

After the fascia assembly 10 has been molded according to the method of the invention as described above, the exterior visible components associated with the front end of the vehicle (or the rear end if this were a rear end fascia assembly) can be mounted to the fascia assembly 10 and properly oriented. This mounting and aligning may be done manually, but it is preferred to use the methods disclosed in pending International Patent Application No. WO 99/21748. The positioning mold of the above-mentioned application may be used in conjunction with a carrier panel to orient and fix the exterior visible components, which include structures such as the headlamps and the grill. Also, the fascia panel may be provided with positioning features in accordance with the teachings of the above-mentioned application so that the exterior visible components are properly oriented without the use of the carrier panel and then are secured to a carrier panel that is part of the partially completed vehicle during installation of the fascia assembly 10.

It should be understood that the method of the present invention may be practiced without using the teachings of the above-mentioned application. That is, one could form a fascia assembly in accordance with the broad teachings of the present invention and then deliver the same to the vehicle manufacturer, who in turn then mounts the fascia assembly to a partially completed vehicle and thereafter secures the exterior visible components in place. However, it is preferred to construct and ship the entire end module assembly with

the fascia assembly formed in accordance with the teachings of the present invention and the exterior visible components mounted and aligned in accordance with the teachings of the above-mentioned application.

Fig. 8 shows another fascia assembly 100 constructed by the method of the present invention. The fascia assembly 100 of Fig. 8 has an exterior fascia panel 102 similar to fascia panel 12 and a pair of rigid lamp receiving cans 104, 106 connected on opposing lateral sides of the fascia panel 12. The lamp cans 104, 106 are made of a rigid material, such as ABS or a glass-filled thermoplastic, and are each configured to have the components of a vehicle head lamp mounted therein (i.e., the bulb, reflective backing, transparent cover, etc.) for connection to the electrical system of the vehicle during assembly. The material for the lamp cans 104, 106 is used to protect the lamp components from damage during vehicle operation and to facilitate heat dissipation. Although the lamp cans 104, 106 illustrated have straight side, top and bottom walls, the shape of the cans 104, 106 may take any desired configuration.

To mold the fascia assembly 100, a two-piece injection molding die assembly 110, shown in Fig. 10, is used. Die assembly 110 has two die portions 112, 114 that have interior surfaces 116, 118 that cooperate to form a die cavity 120. The die portions 112, 114 each have a passageway 122, 124 formed therethrough that communicates with gates 126, 128 and opens to the interior surfaces 116, 118.

To mold the fascia assembly 110, the die portions 112, 114 are brought together into their sealed, operative positions (as shown in Fig. 10) and the die cavity 120 is vacuumed. Then, gate 126 is opened to inject a first molten material into the die cavity 120 through passageway 122. The first molten material fills most of the die cavity 120 and forms the fascia panel 102 when solidified. A portion of the first molten material partially fills the area of the die cavity indicated at 130 to provide the panel 102 with a connecting portion 132. Then, gate 126 is closed and gate 128 is opened to inject a second molten material into the die cavity 120 through passageway 124. This second molten material fills the remainder of the die cavity 120 and forms the lamp receiving can 106. A portion of this second molten material fills the remainder of the area indicated at 130 to provide the lamp can 104 with a connecting portion 134. The assembly 100 is then solidified so that the connecting portions 132, 134 are solidified to and interconnected and the assembly 100 is removed from the mold.

As with fascia assembly 10, interlocking structures 136 may be used in fascia assembly 100 to enhance the connection between the connecting portions 132, 134. These interlocking structures 136 may be mold inserts or driven into the connecting portions 132, 134 after solidification.

It should be understood that Fig. 10 is a cross-section of the mold assembly 110

taken along the portion where one lamp receiving can is being formed and the second die portion 114 will have another passageway (not shown) with another gate (not shown) for forming another lamp receiving can simultaneously as the can 106 described with respect to Fig. 10 is being formed.

5 Using the method of the present invention to interconnect the lamp receiving cans 104, 106 to the fascia panel 102 is particularly advantageous because it ensures that the cans 104, 106 remain fixed and properly aligned with respect to the fascia panel 102 as the fascia assembly 100 is being assembled to the vehicle. Specifically, the interconnection
10 between the cans 104, 106 and the panel 102 prevents spaces from being created between the cans 104, 106 and the panel 102 as a result of misalignment during assembly and ensures that the resultant front end (or rear end) has an aesthetically pleasing appearance.

 Fig. 11 depicts yet another fascia assembly 200 formed using the method of the present invention. The fascia assembly 200 is molded in a manner similar to the way in which the fascia assembly 100 was formed. The fascia assembly 200 has a fascia panel
15 202 formed from a somewhat flexible material to resist permanent deformation when impacted and a pair of rigid lamp receiving cans 104, 106 formed from a rigid material such as a glass filled thermoplastic. The lamp cans 204, 206 have connecting portions 208 molded and solidified to connecting portions 210 of the panel 202 in the same manner as described above.

20 Between the two cans 204, 206 extends a grill opening reinforcement structure, generally indicated at 212. The reinforcement structure 212 is made from the same material as the lamp cans 204, 206 and has a connecting portion 214 and a series of anchoring structures 216 to which a vehicle grill (not shown) can be fixedly attached. The connecting portion 214 is molded and solidified to a transversely extending central
25 connecting portion 218 on the panel 202. The spaces between the anchoring structures 216 is provided to allow airflow through the grill to the engine compartment during vehicle operation.

 The advantage of the assembly of Fig. 11 is that grill can be mounted to the reinforcement structure 216 prior to delivery to the final assembly site and there is no need
30 for an additional carrier panel for mounting the grill and headlamps.

 Fig. 12 shows a cross-section of yet another fascia assembly 300 constructed according to the method of the present invention. The assembly 300 has the fascia panel 302 and the bumper beam 304 with a series of energy absorbing structures 306 disposed therebetween. The energy absorbing structure 306 is molded from a foam or other similar
35 material and is designed to collapse during an automotive impact so as to absorb a portion of the impact's energy and reduce the amount of energy that would otherwise be transferred to the vehicle frame.

Each energy absorbing structure 306 has a first connecting structure 308 molded and solidified to connecting portion 310 of the fascia panel 302. This may be achieved by a two-shot molding operation similar to the ones discussed above or by molding the panel 302 at one molding station and molding the absorbing structures 306 to the solidified panel 302 at another station. Then, after the panel 302 and absorbing structures 306 have been molded and connected together, the bumper beam 304 is molded and solidified so as to interconnect connecting portions 312 from the absorbing structure to connecting portions 314 of the bumper beam 304. It can be appreciated that the operation can be reversed by molding the panel 302 last instead of the bumper beam 304.

It can thus be seen that the objectives of the present invention have been fully and effectively accomplished. It is to be understood, however, that the foregoing specific embodiments have been provided for the purpose of illustrating the principle of the present invention and are not intended to be limiting. To the contrary, the present invention is intended to cover all modifications, alterations, and substitutions within the scope of the appended claims.

WHAT IS CLAIMED:

1. A method for forming a fascia assembly that is to be mounted on a front or rear end of a partially completed motor vehicle, comprising:
 - molding and solidifying a molten first material so as to form an exterior fascia panel having a first connecting portion integrally molded therewith, said fascia panel being configured to constitute a portion of a vehicle body assembly when said fascia assembly is mounted on the front or rear end of the partially completed vehicle; and
 - molding and solidifying a molten second material so as to form a fascia assembly component having a second connecting portion integrally molded therewith with said second connecting portion of said fascia assembly component being molded and solidified to said first connecting portion of said exterior fascia panel in an interconnected relationship such that said connecting portions cooperate to interconnect said exterior fascia panel and said fascia assembly component together for subsequent transport and mounting to the partially completed vehicle.
2. A method according to claim 1, wherein molding and solidifying said molten second material so as to form said fascia assembly component includes molding and solidifying said molten second material so as to form a lamp receiving structure.
3. A method according to claim 2, wherein molding and solidifying said molten second material so as to form a lamp receiving structure includes molding and solidifying said molten second material so as to form a pair of lamp receiving cans that are spaced apart from one another in a transverse direction of said fascia assembly, each of said lamp receiving cans being constructed and arranged to allow a lamp bulb to be mounted therein and electrically connected to an electrical system of the motor vehicle and to allow a lens to be mounted in covering relation with respect to said lamp bulb when said fascia assembly is mounted to the front or rear end of the vehicle.
4. A method according to claim 1, wherein molding and solidifying said first molten material so as to form said fascia panel includes forming a grill receiving opening in said fascia panel and wherein molding and solidifying said molten second material so as to form said fascia assembly component includes molding and solidifying said molten second material so as to form a grill opening reinforcement structure that extends transversely with respect to said fascia panel, said grill opening reinforcement structure being constructed and arranged to have a grill mounted thereto.
5. A method according to claim 4, wherein molding and solidifying said molten second material so as to form said fascia assembly component includes molding and solidifying said molten second material so as to form a pair of lamp receiving cans that are spaced apart from one another in a transverse direction of said fascia assembly on opposing sides of said grill opening reinforcement structure, each of said lamp receiving

cans being constructed and arranged to allow a lamp bulb to be mounted therein and electrically connected to an electrical system of the motor vehicle and to allow a lens to be mounted in covering relation with respect to said lamp bulb when said fascia assembly is mounted to the front or rear end of the vehicle.

5 6. A method according to claim 1, wherein molding and solidifying said molten second material so as to form said fascia assembly component includes molding and solidifying said molten second material so as to form a collapsible impact absorbing structure, said impact absorbing structure being constructed and arranged to be operatively connected to a frame of the motor vehicle and to collapse when said fascia panel impacts
10 an object during an automotive collision such that said absorbing structure absorbs at least a portion of the energy of the impact and prevents the absorbed portion of energy from being transmitted to the frame.

7. A method according to claim 6, wherein said collapsible impact absorbing structure is molded and solidified so as to integrally mold a third connecting portion with said
15 collapsible impact absorbing structure, and wherein said method further comprises:
molding and solidifying a molten third material so as to form a bumper beam having a fourth connecting portion molded and solidified to the third interconnecting structure of said impact absorbing structure in an interconnected relationship wherein said connecting portion of said bumper beam and said third connecting portion of said
20 collapsible impact absorbing structure interconnect said bumper beam and said impact absorbing structure together, said third material having a greater rigidity than either of said first and second materials when solidified.

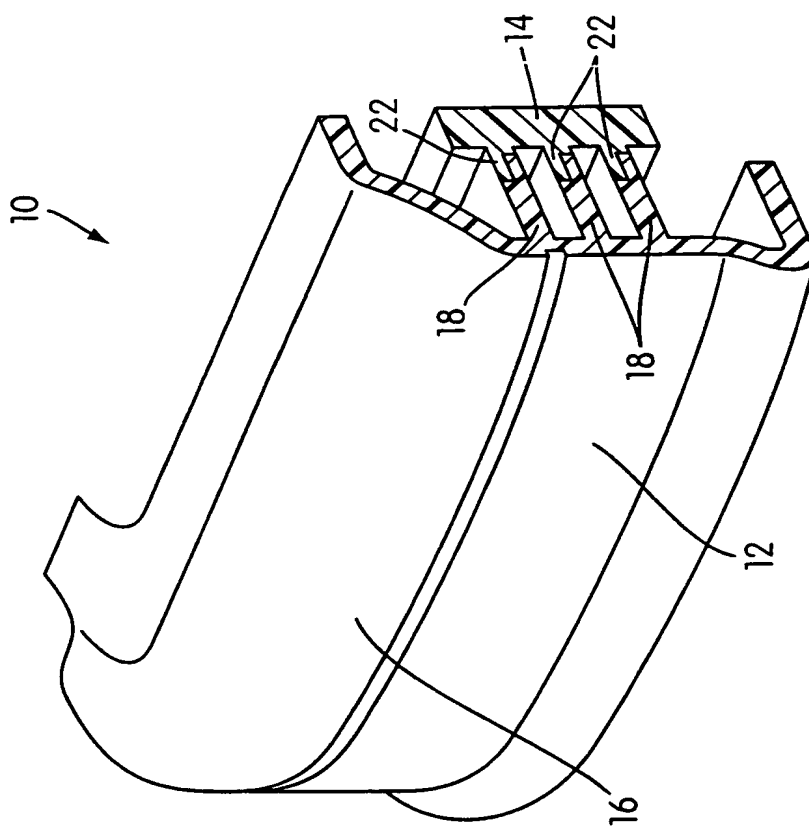


FIG. 1

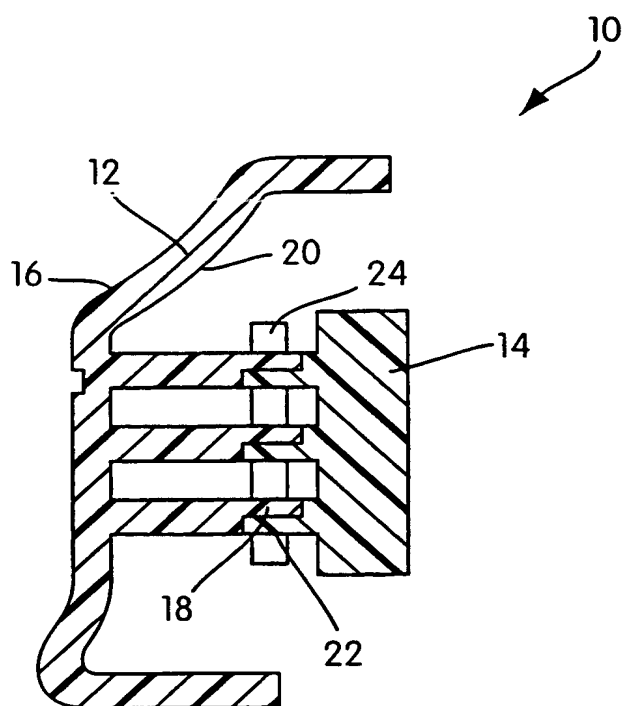


FIG. 2

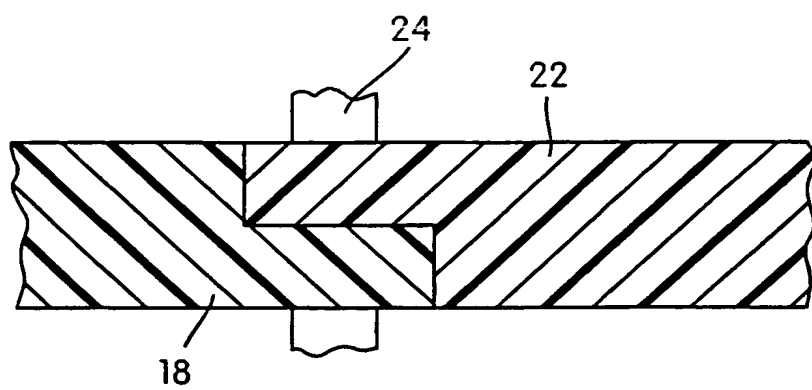


FIG. 3

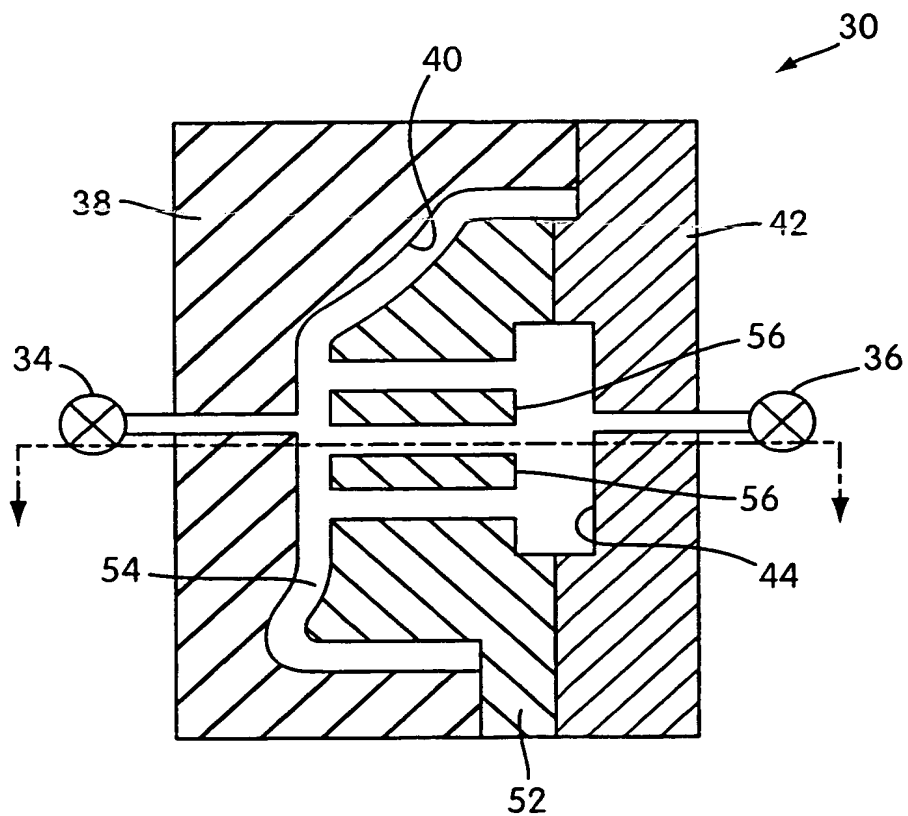


FIG. 4

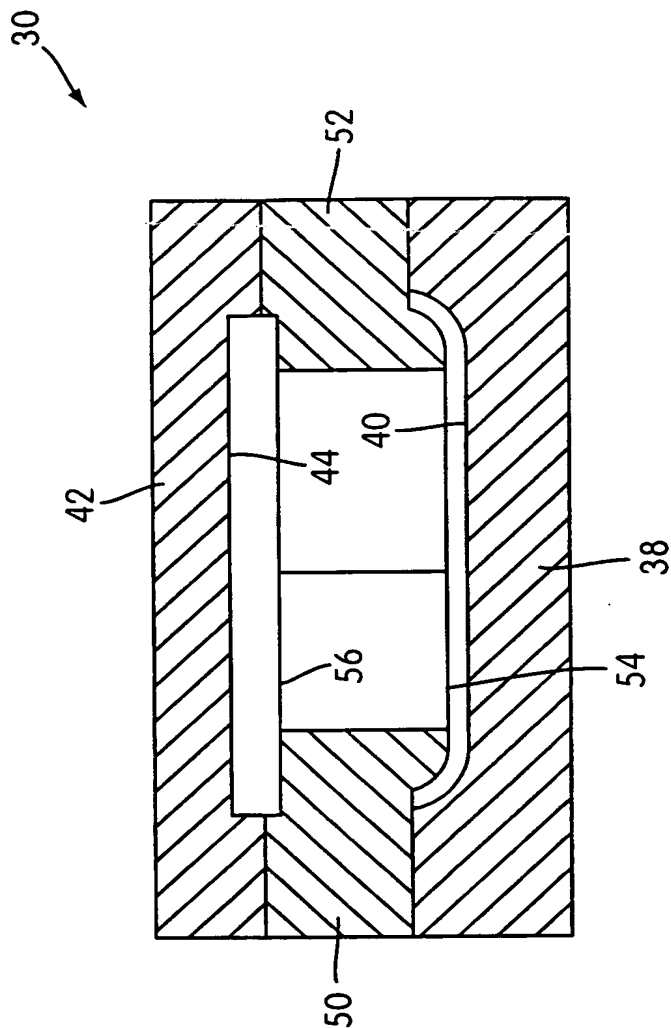


FIG. 5

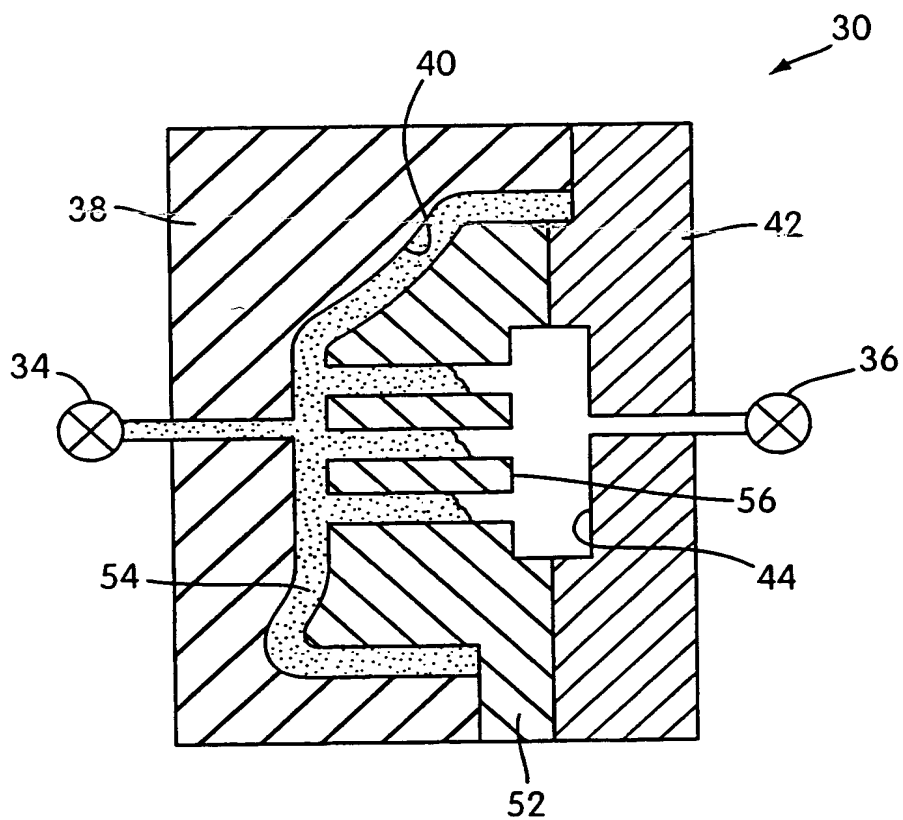


FIG. 6

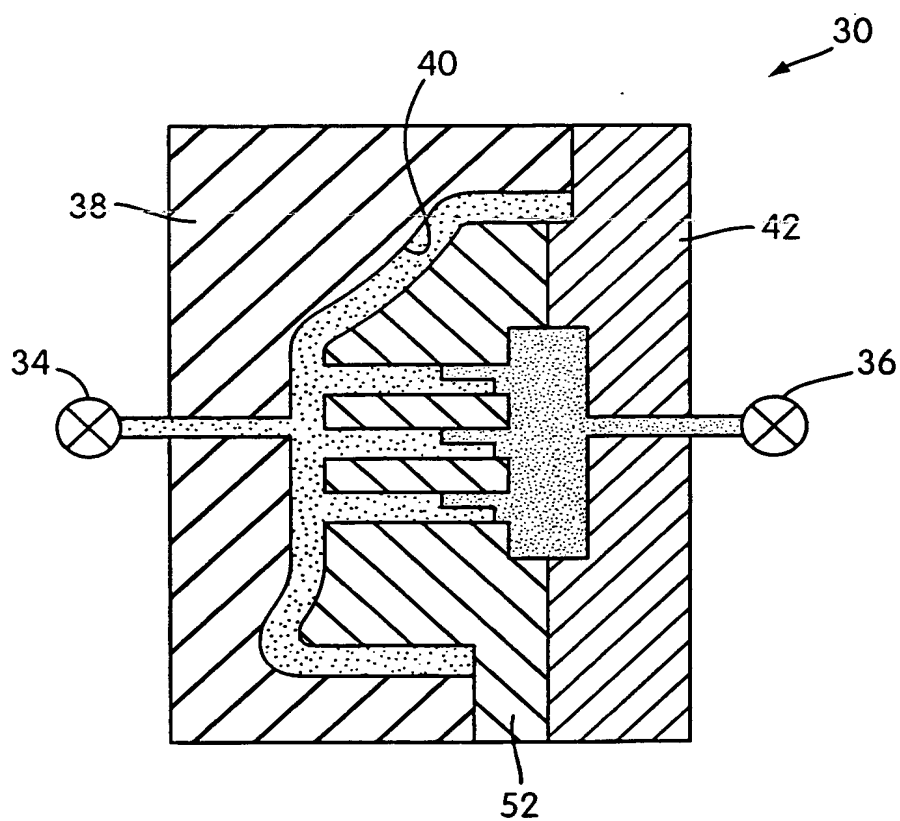


FIG. 7

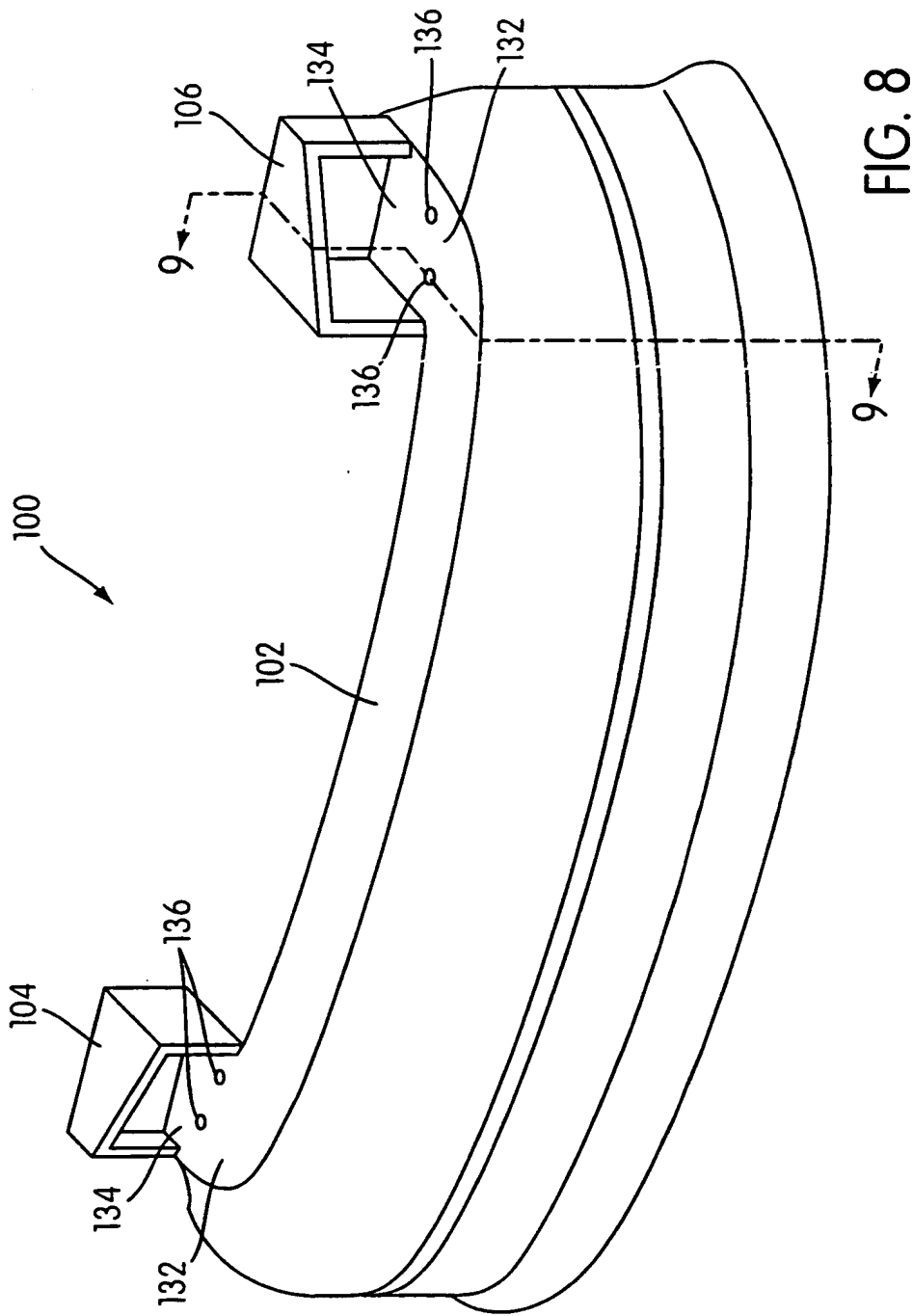


FIG. 8

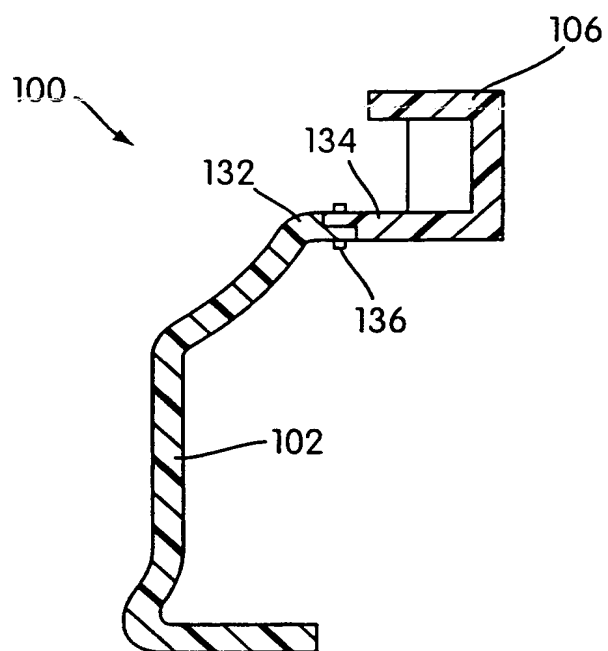


FIG. 9

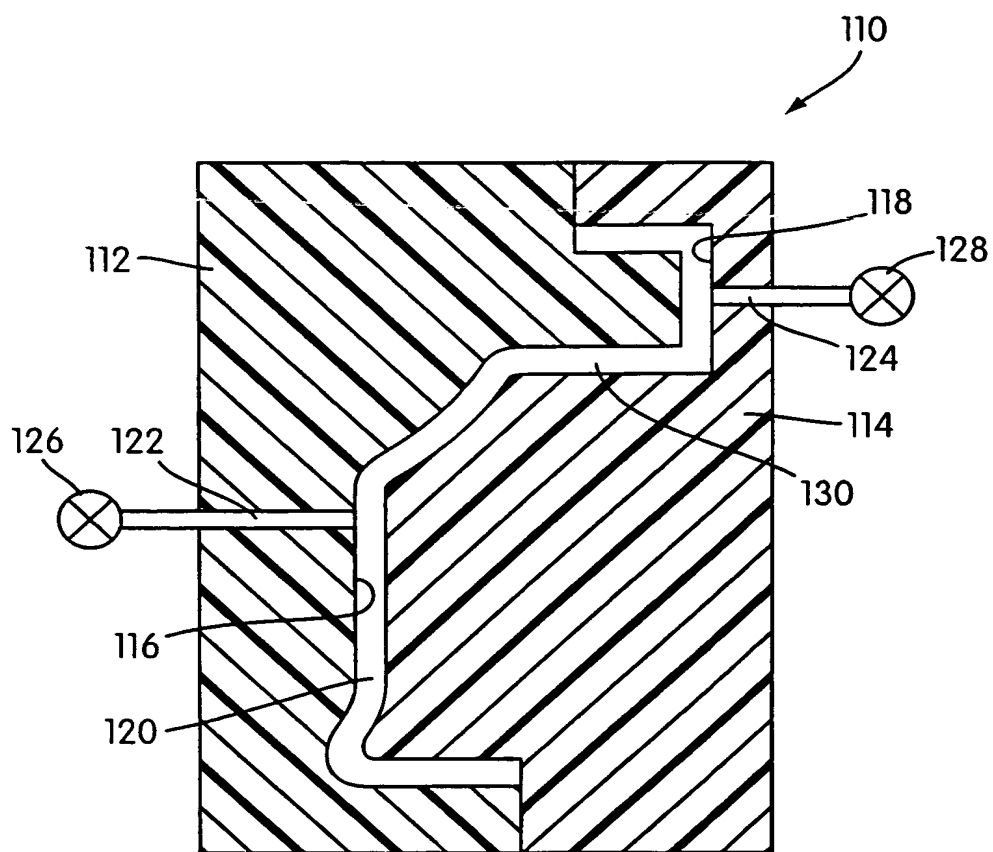


FIG. 10

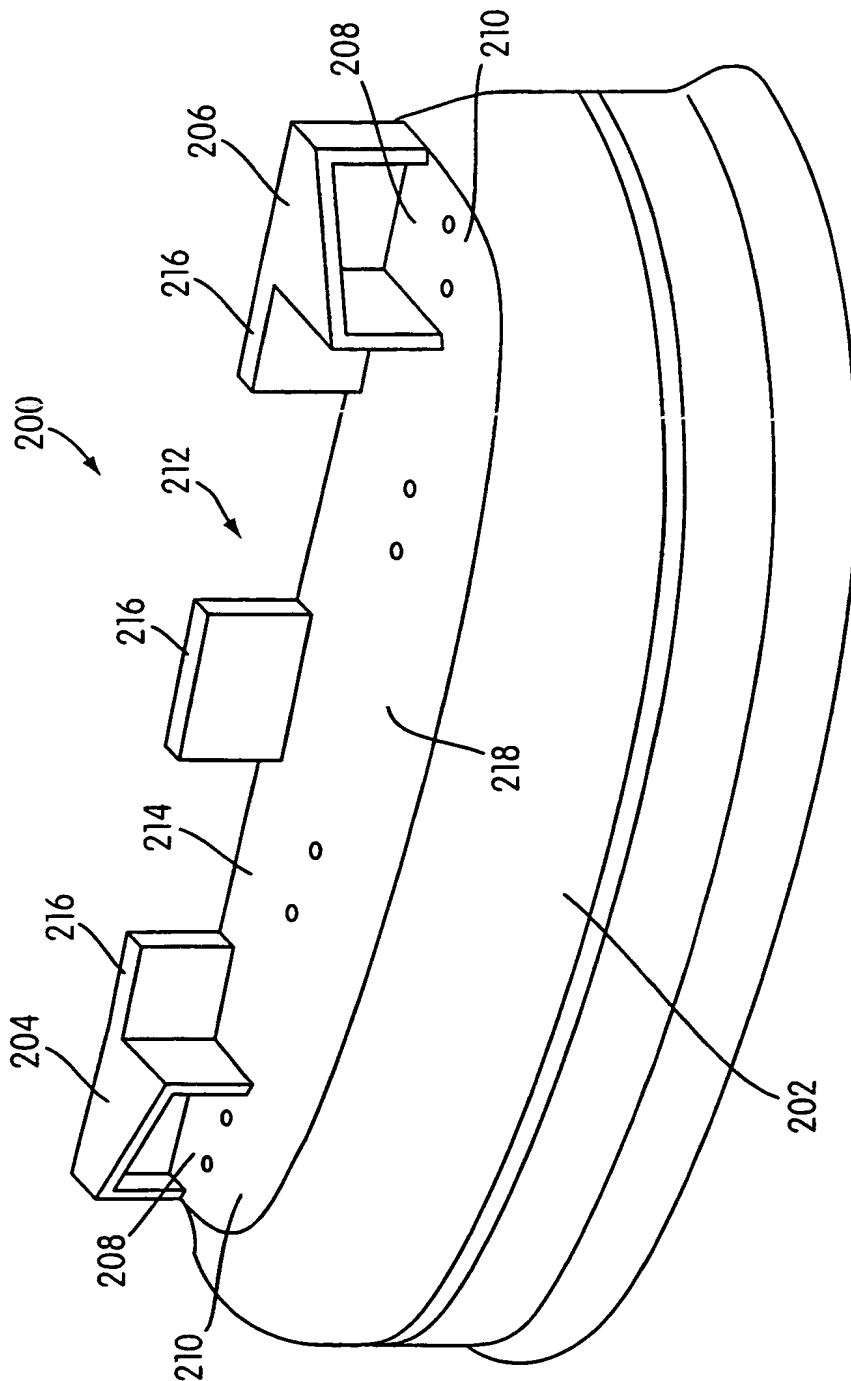


FIG. 11

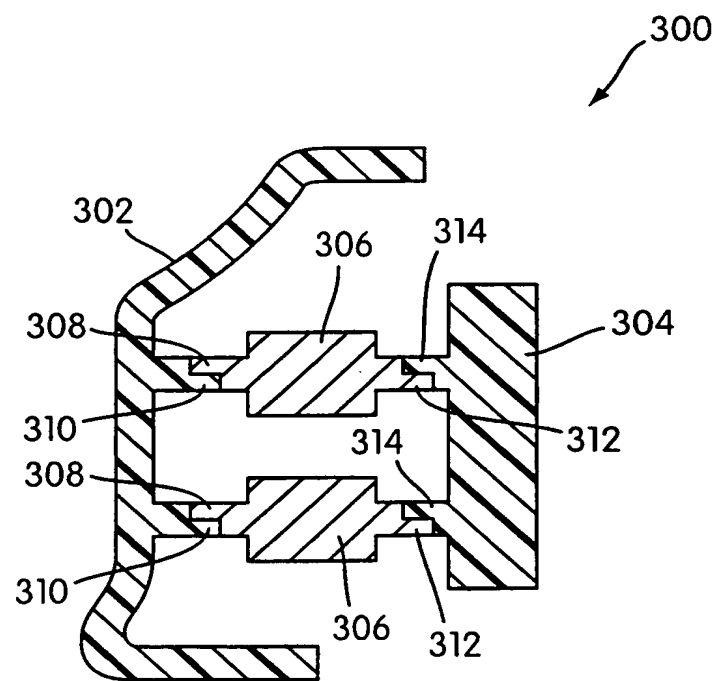


FIG. 12